

REMARKS

This application has been carefully reviewed in light of the Office Action dated October 30, 2007. Claims 1 to 24 are currently in the application, with Claims 12 to 24 having been withdrawn from consideration. Claims 1 and 6 are the independent claims currently under consideration, and both Claims 1 and 6 have been amended. Reconsideration and further examination are respectfully requested.

In the Office Action Claims 1, 4 to 6 and 8 to 11 were rejected under 35 U.S.C. §102(b) in view of U.S. Patent No. 6,032,904 (Hosick), and were rejected under 35 U.S.C. §103 over U.S. Patent No. 6,622,969 (Yamashita) in view of U.S. Patent No. 6,481,672 (Goodzeit); and Claims 2, 3 and 7 were rejected under U.S.C. §103 over Yamashita, Goodzeit and U.S. Patent No. 6,870,164 (Baldwin), and again under 35 U.S.C. §103 over Hosick in view of Baldwin. Reconsideration and withdrawal are respectfully requested.

Independent Claim 1 generally concerns a system for providing attitude control with respect to a spacecraft. The system includes first control logic configured to adjust a plurality of reaction wheel assemblies associated with the spacecraft in order to control the attitude of the spacecraft. The system also includes second control logic configured to use a plurality of gimbaled thrusters associated with the spacecraft to control the momentum associated with adjusting the plurality of reaction wheel assemblies. The first control logic is configured to modify adjustment to the plurality of reaction wheel assemblies based on a torque deficit associated with the plurality of gimbaled thrusters.

The Office Action at page 5 contended that the "wherein" clause of Claim 1 does not limit the apparatus or structure of the claim, and therefore the clause carries no patentable weight. Claim 1 as amended recites that "the first control logic is configured to modify

adjustment to the plurality of reaction wheel assemblies based on a torque deficit associated with the plurality of gimbaled thrusters”, and such amendment is seen to attend to this contention.

As to the rejections over art, Hosick, Yamashita, Goodzeit and Baldwin are not seen to disclose or suggest at least the feature of modifying adjustment to a plurality of reaction wheel assemblies based on a torque deficit associated with a plurality of gimbaled thrusters.

The Office Action at page 5 alleged that the reaction wheels and the thrusters of the applied references work together to control the spacecraft so if one is not supplying enough torque, the other is capable of being used to compensate. Applicants respectfully disagree.

As understood by Applicants, Hosick discloses a system utilizing a pair of electric thrusters which co-operate for orbit raising and for selectively unloading momentum wheels used for controlling the orientation of the spacecraft. See Hosick, column 1, lines 7 to 12. When wheel speeds reach threshold values, an unload logic module gimbals electric thrusters away from the normal orbit raising position to produce a desired torque. The unload logic module holds the electric thrusters at the unload position until the wheels are sufficiently desaturated at which point the electric thrusters are returned to the nominal no-torque orbit raising position. See Hosick, column 10, lines 14 to 21.

As such, Hosick is seen to disclose a scenario in which electric thrusters are adjusted based on the speed of momentum wheels. However, Hosick is not seen to disclose or suggest the reverse scenario, in which the adjustment of its momentum wheels is modified based on a state of the electric thrusters. Accordingly, Hosick could not be seen to disclose or suggest modifying adjustment to a plurality of reaction wheel assemblies based on a torque deficit associated with a plurality of gimbaled thrusters.

In addition, Yamashita, Goodzeit and Baldwin have been reviewed and are not seen to compensate for the deficiencies of Hosick. In particular, none of these references are seen to disclose or suggest modifying adjustment to a plurality of reaction wheel assemblies based on a torque deficit associated with a plurality of gimbale thrusters.

Independent Claim 1 is therefore believed to be allowable.

Independent Claim 6 generally concerns a system for providing attitude control with respect to a spacecraft. The system includes a reaction wheel control module configured to adjust a plurality of reaction wheel assemblies associated with the spacecraft in order to control the attitude of the spacecraft. The system also includes a maneuver control module configured to use a plurality of gimbale thrusters to control the total momentum of the spacecraft, the total momentum including the momentum associated with the plurality of reaction wheel assemblies during an orbit transfer. The reaction wheel control module is configured to modify adjustment to the plurality of reaction wheel assemblies based on a torque deficit associated with the plurality of gimbale thrusters.

Thus, among its many features, Claim 6 provides for modifying adjustment to a plurality of reaction wheel assemblies based on a torque deficit associated with a plurality of gimbale thrusters. The applied references of Hosick, Yamashita, Goodzeit and Baldwin are not seen to disclose or suggest at least this feature, for reasons similar to those discussed above. Accordingly, Claim 6 is believed to be allowable.

The other claims currently under consideration in the application are dependent from the independent claims discussed above and therefore are believed to be allowable over the applied references for at least the same reasons. Because each dependent claim is deemed to define an

additional aspect of the invention, however, the individual consideration of each on its own merits is respectfully requested.

In view of the foregoing amendment and remarks, the entire application is believed to be in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience.

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Applicants' undersigned representative may be reached at the telephone number and address indicated below. All correspondence should continue to be directed to the address associated with Customer No. 31824.

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